

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

07 - Operational System Development**0305207F Manned Reconnaissance System**

COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	53,479	23,798	0	0	0	0	8,693	Continuing	TBD
674754 COBRA BALL	5,950	11,363	0	0	0	0	8,693	Continuing	TBD
674820 Manned Reconnaissance Systems U-2	47,529	12,435	0	0	0	0	0	Continuing	TBD
Quantity of RDT&E Articles	1	0	0	0	0	0	0	0	0

Funding for FY99-05 transferred to Air Force PE 0305207F from DARO Divestiture PE 0305207D. Funding for project 674820 in FY01-05 Transferred to PE 0305202F in FY01.

(U) **A. Mission Description**

The RDT&E portion of this PE supports development efforts required to enhance and sustain the U-2 and RC-135 reconnaissance aircraft. The RDT&E efforts in this PE focus on sensor and safety of flight projects.

(U) **B. Budget Activity Justification**

The program is categorized as Budget Activity 7 because it provided for development of technologies and capabilities in support of operational system development

(U) **C. Program Change Summary (\$ in Thousands)**

	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total Cost</u>
(U) Previous President's Budget (FY 2000 PBR)	44,241	9,388	0	TBD
(U) Appropriated Value	44,366	24,388		
(U) Adjustments to Appropriated Value				
a. Congressional/General Reductions	-125			
b. Small Business Innovative Research				
c. Omnibus or Other Above Threshold Reprogram	9,537	-130		
d. Below Threshold Reprogram				
e. Rescissions	-299	-460		
f. Other				TBD
(U) Adjustments to Budget Years Since FY 2000 PBR				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

07 - Operational System Development

0305207F Manned Reconnaissance System

(U) C. Program Change Summary (\$ in Thousands) Continued

	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total Cost</u>
(U) Current Budget Submit/FY 2001 PBR	53,479	23,798	0	TBD

(U) Significant Program Changes:

FY99: DD1415 New Start notification for U2 Defensive Systems QRC approved by Congress. Funds reprogrammed from other AF sources to support this new start.
 FY01: U-2 Electronic Warfare System (EWS) reprogramming from RDT & E to Procurement (\$4.595M).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

07 - Operational System Development

PE NUMBER AND TITLE

0305207F Manned Reconnaissance System

PROJECT

674754

COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
674754 COBRA BALL	5,950	11,363	0	0	0	0	8,693	0	30,801

(U) A. Mission Description

Laser Ranging and Imaging System (LRIS) -- This project supports design studies, engineering analysis, non-recurring engineering, and other efforts associated with modifications to the RC-135 or its mission systems. The results of these efforts provide the requisite engineering necessary to implement modifications or provide a preliminary assessment of the technical feasibility, operability, or general military utility of an application. FY99 funds (Congressional plus-up) continues the Laser Ranging and Imaging system for the COBRA Ball platform and includes system testing in Maui. This project has been called the Field Laser Demonstration (FLD) and the Advanced Airborne Sensor (AAS) in past budget documentation. FY05 funds air traffic control and navigational safety non-recurring engineering for the RC-135 fleet.

Multi-Function Self-Aligned Gate Technology (MSAG) -- Congress supports the development of the multi-function self-aligned gate active aperture antenna (AAA) technology for use on Reconnaissance aircraft. This system will provide wide-band, duplex, communications links simultaneously to a ground unit, other aircraft, and a satellite surrogate. This electronically steered array is a cost-effective solution to numerous DoD requirements.

On-Board Pre-Processing (OBPP) -- The prototype pre-processing effort will develop the capability to screen the data as close to the collection source as possible and advise analysts which data requires immediate expert human intervention. The effort involves the development of an electronic support system and software development.

(U) FY 1999 (\$ in Thousands)

(U)	\$2,083	Subsystem and system integration testing
(U)	\$1,000	Design and fabricate systems
(U)	\$400	Completed Range-in-a-Box fabrication and test
(U)	\$200	Completed downselect of experimental aircraft and aircraft interface design
(U)	\$300	Developed Maui interfaces, prepare and ship system
(U)	\$1,967	Performed system performance characterization and demonstration testing
(U)	\$5,950	Total

Project 674754

Page 3 of 12 Pages

Exhibit R-2A (PE 0305207F)

1477

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

07 - Operational System Development

0305207F Manned Reconnaissance System

674754

(U) **A. Mission Description Continued**(U) **FY 2000 (\$ in Thousands)**

(U) \$4,000 LRIS (Continuation of Congressionally directed and funded program)

(U) \$0 - \$2,400 Field Testing (LRIS)

(U) \$0 - \$1,000 Integration of Acquisition Systems (LRIS)

(U) \$0 - \$600 System Modification (LRIS)

(U) \$3,000 Evaluate the MSAG AAA for use on the RC-135 as directed by Congress

(U) \$4,363 On Board Preprocessor Prototype (OBPP - Congressionally added program)

(U) \$0 - \$2,000 Electronic Support System (Prototype Preprocessor - Congressionally added)

(U) \$0 - \$2,363 Preprocessing Software Development (Prototype Preprocessor)

(U) \$11,363 Total

(U) **FY 2001 (\$ in Thousands)**

(U) \$0 None. Prior year efforts reflect Congressionally added funding.

(U) \$0 Total

(U) **B. Project Change Summary**

Added the Multi-Function Self-Aligned Gate Technology and On-Board Pre-Processing effort to FY00.

(U) **C. Other Program Funding Summary (\$ in Thousands)**

	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U) APPN 10,APAF, Line 55	137,201	234,385	147,199	142,840	125,348	77,632	83,978	Continuing	TBD

(U) **D. Acquisition Strategy**

The RC-135 development and enhancement activities are managed by the Air Force through the BIG SAFARI program in the Reconnaissance System Program Office. These projects are managed by ASC/RA. ASC/RA provides technical oversight and management of all aircraft, ground and support system modifications, integration and flight test engineering responsibility, product assurance and acceptance testing, and logistics and training activities.

(U) **E. Schedule Profile**FY 1999FY 2000FY 2001

Project 674754

Page 4 of 12 Pages

Exhibit R-2A (PE 0305207F)

1478

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

07 - Operational System Development

0305207F Manned Reconnaissance System

674754

(U) E. Schedule Profile Continued

FY 1999				FY 2000				FY 2001			
1	2	3	4	1	2	3	4	1	2	3	4
	*										
	*										
					X						
									X		
								X			
									X		

(U) Preliminary Design Review (LRIS)

(U) Critical Design Review (LRIS)

(U) Prototype Delivery (LRIS)

(U) Engineering Analysis Report (MSAG)

(U) Electronic Support System (OBPP)

(U) Software Prototype (OBPP)

* - Denotes completed event

X - Denotes planned event

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)								DATE February 2000		
BUDGET ACTIVITY				PE NUMBER AND TITLE					PROJECT	
07 - Operational System Development				0305207F Manned Reconnaissance System					674754	
(U) <u>A. Project Cost Breakdown (\$ in Thousands)</u>										
				FY 1999		FY 2000		FY 2001		
(U) System Design and Analysis				1,200		3,000		0		
(U) Fabrication and Test				4,050		6,363				
(U) Integration and Support				700		2,000				
(U) Total				5,950		11,363		0		
(U) <u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U) <u>Performing Organizations:</u>										
<u>Contractor or</u>		<u>Contract</u>								
<u>Government</u>		<u>Method/Type</u>								
<u>Performing</u>		<u>Award or</u>		<u>Performing</u>		<u>Project</u>				
<u>Activity</u>		<u>or Funding</u>		<u>Activity</u>		<u>Office</u>		<u>Total Prior</u>		
<u>Vehicle</u>		<u>Obligation</u>		<u>EAC</u>		<u>EAC</u>		<u>to FY 1999</u>		
<u>Date</u>		<u>Vehicle</u>		<u>EAC</u>		<u>FY 1999</u>		<u>FY 2000</u>		
<u>FY 2001</u>		<u>Budget to</u>		<u>Budget</u>		<u>Budget</u>		<u>Budget to</u>		
<u>Complete</u>		<u>Program</u>								
<u>Product Development Organizations</u>										
ASC/RAB		Multiple		Aug 97		N/A		N/A		
<u>Support and Management Organizations</u>										
<u>Test and Evaluation Organizations</u>										
				<u>Total Prior</u>		<u>Budget</u>		<u>Budget</u>		
<u>Subtotals</u>				<u>to FY 1999</u>		<u>FY 1999</u>		<u>FY 2000</u>		
Subtotal Product Development				4,795		5,950		11,363		
Subtotal Support and Management										
Subtotal Test and Evaluation										
Total Project				4,795		5,950		11,363		

Project 674754

Page 6 of 12 Pages

Exhibit R-3 (PE 0305207F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

07 - Operational System Development

PE NUMBER AND TITLE

0305207F Manned Reconnaissance System

PROJECT

674820

COST (\$ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
674820 Manned Reconnaissance Systems U-2	47,529	12,435	0	0	0	0	0	Continuing	TBD

(U) **A. Mission Description**

This development project supports high payoff improvements for the U-2 Advanced Synthetic Aperture Radar System (ASARS-2) through the ASARS-2 Improvement Program (AIP). AIP improves area search, precision geolocation, and image quality characteristics sufficiently to directly support the targeting of precision guided munitions (PGMs). Complex imagery will be produced by the AIP system and support significant exploitation products for the imagery analysts. AIP champions the introduction of Asynchronous Transfer Mode (ATM) datalink formats to the ISR community and supports National Imagery Transmission Format (NITF) standards. Several Line Replaceable Units (LRU) including the Process Control Unit (PCU), Receiver - Exciter (RE), and transmitter are approaching the end of their supportability life. Developing new LRUs with next generation technology will make ASARS-2 supportable through the expected service life of the U-2 and provide capability enhancements necessary to support PGMs. Improvements to the ASARS-2 are directly transferable to Global Hawk High Altitude Endurance Unmanned Aerial Vehicles (HAE UAV) should migration of this improvement become a requirement. AIP incorporated interface to Dual Data Link II (DDL II) will provide an enhanced operational capability. Also, this project accomplishes the development of a quick reaction capability (QRC) to improve the U-2 electronic warfare system (EWS) capability for Southwest Asia. Lastly this project includes funds from FY99 congressional additions to develop cockpit display improvements, conduct risk reduction studies for aircraft fuel conversion and complete reliability and maintainability upgrades and initial spares procurement for the SENIOR GLASS system.

* FY99 is understated by 266K. BTR not reflected in ABIDES database.

(U) **FY 1999 (\$ in Thousands)**

(U) \$5,000	Completed R&M upgrades and procures initial spares for SENIOR GLASS
(U) \$3,000	Cockpit display improvements development
(U) \$1,250	Risk reduction studies for fuels conversion to JP-8 from JP-TS
(U) \$2,300	AIP Baseline Exploitation tools development
(U) \$13,680	Continued development of AIP on-board processor
(U) \$620	Flight test support
(U) \$220	SPO Support
(U) \$2,120	Post-processing Exploitation Tool Development (Super-Resolution, CCD, IFSAR)
(U) \$2,500	Continued Receiver-Exciter Controller development
(U) \$250	Advanced data storage array development

Project 674820

Page 7 of 12 Pages

Exhibit R-2A (PE 0305207F)

1481

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000																																
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																																
07 - Operational System Development	0305207F Manned Reconnaissance System	674820																																
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 1999 (\$ in Thousands) Continued</u></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">(U) \$4,352</td> <td>Continued development of AIP Range migration software</td> </tr> <tr> <td>(U) \$2,700</td> <td>Continued development of ASARS-2 Data Link</td> </tr> <tr> <td>(U) \$9,537</td> <td>U-2 QRC Defensive System Development</td> </tr> <tr> <td>(U) \$47,529</td> <td>Total</td> </tr> </table> <p>(U) <u>FY 2000 (\$ in Thousands)</u></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">(U) \$3,500</td> <td>Develop DDL II interface to AIP (Congressionally added effort)</td> </tr> <tr> <td>(U) \$502</td> <td>Continued development of AIP on board processor</td> </tr> <tr> <td>(U) \$1,000</td> <td>Continued development of AIP Range migration software</td> </tr> <tr> <td>(U) \$4,850</td> <td>U-2 QRC Defensive System development</td> </tr> <tr> <td>(U) \$1,172</td> <td>Common Exploitation Tools</td> </tr> <tr> <td>(U) \$475</td> <td>SPO Support (AIP)</td> </tr> <tr> <td>(U) \$636</td> <td>Begin Beyond Line of Sight (BLOS) data link interface integration (AIP)</td> </tr> <tr> <td>(U) \$225</td> <td>Begin Radar Transmitter Development (AIP)</td> </tr> <tr> <td>(U) \$75</td> <td>Develop AIP employment concept scenarios</td> </tr> <tr> <td>(U) \$12,435</td> <td>Total</td> </tr> </table> <p>(U) <u>FY 2001 (\$ in Thousands)</u></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">(U) \$0</td> <td>Funding transferred to PE 0305202F</td> </tr> <tr> <td>(U) \$0</td> <td>Total</td> </tr> </table> <p>(U) <u>B. Project Change Summary</u></p> <p>FY99 Congressional adds: AIP (\$9.0M), SENIOR GLASS (\$5M), cockpit upgrade development (\$3M) and risk reduction for fuel conversion to JP-8 (\$3.6M).</p> <p>FY00 Congressional adds: Dual Data Link upgrade (\$3.5M)</p> <p>FY01 U-2 EWS QRC reprogrammed from RDT & E to procurement to meet higher priority AF and Theater requirements (\$4.595M).</p>			(U) \$4,352	Continued development of AIP Range migration software	(U) \$2,700	Continued development of ASARS-2 Data Link	(U) \$9,537	U-2 QRC Defensive System Development	(U) \$47,529	Total	(U) \$3,500	Develop DDL II interface to AIP (Congressionally added effort)	(U) \$502	Continued development of AIP on board processor	(U) \$1,000	Continued development of AIP Range migration software	(U) \$4,850	U-2 QRC Defensive System development	(U) \$1,172	Common Exploitation Tools	(U) \$475	SPO Support (AIP)	(U) \$636	Begin Beyond Line of Sight (BLOS) data link interface integration (AIP)	(U) \$225	Begin Radar Transmitter Development (AIP)	(U) \$75	Develop AIP employment concept scenarios	(U) \$12,435	Total	(U) \$0	Funding transferred to PE 0305202F	(U) \$0	Total
(U) \$4,352	Continued development of AIP Range migration software																																	
(U) \$2,700	Continued development of ASARS-2 Data Link																																	
(U) \$9,537	U-2 QRC Defensive System Development																																	
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(U) \$225	Begin Radar Transmitter Development (AIP)																																	
(U) \$75	Develop AIP employment concept scenarios																																	
(U) \$12,435	Total																																	
(U) \$0	Funding transferred to PE 0305202F																																	
(U) \$0	Total																																	
<div style="display: flex; justify-content: space-between;"> Project 674820 Page 8 of 12 Pages Exhibit R-2A (PE 0305207F) </div>																																		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

07 - Operational System Development

0305207F Manned Reconnaissance System

674820

(U) **C. Other Program Funding Summary (\$ in Thousands)**

	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U) AF RDT&E PE 0305202 AIP	0	0	27,546	24,118	8,224	1,936	1,931	Continuing	TBD
(U) AIP Production* (APAF**)	39,364	15,312	0	0	0	0	0	Continuing	TBD
PE 0305207									
(U) AIP Production PE 0305202	0	0	12,777	18,659	15,380	6,066	4,016	Continuing	TBD

* First Upgraded Radar Transmitter Deliveries in 3QFY03
 ** APAF production funding shown in PE 0305202F FY01-05

(U) **D. Acquisition Strategy**

For airborne collection capability upgrades, modify existing platform and associated ground control equipment via Engineering Change Proposals (ECPs)/Task orders to existing USAF contracts. Develop an electronic defensive system QRC capability, then deploy and sustain on U-2 aircraft in Southwest Asia. For ASARS-2, develop and test new technology line replaceable units (LRU's) for subsequent retrofit into the U-2's, this may be performed during normal operations, U-2 Programmed Depot Maintenance (PDM), or during other ongoing U-2 modifications.

(U) **E. Schedule Profile**

	<u>FY 1999</u>			<u>FY 2000</u>			<u>FY 2001</u>					
	1	2	3	4	1	2	3	4	1	2	3	4
(U) Production Critical Design Review	*											
(U) Test & Evaluation Milestones N/A												
(U) -AIP Prototype Flight Test				*								
(U) -AIP Production Flight Test					*							
(U) AIP IOC									X			
(U) U-2 EWS QRC												
(U) Engineering Milestones N/A												
(U) -Contract Award		*										
(U) -SDR			*									
(U) -Critical Design Review				*								
(U) -QRC Ground Test									X			
(U) -QRC Flight Test										X		
(U) -QRC IOC										X		

Project 674820

Page 9 of 12 Pages

Exhibit R-2A (PE 0305207F)

1483

UNCLASSIFIED

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

February 2000

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

07 - Operational System Development

0305207F Manned Reconnaissance System

674820

(U) E. Schedule Profile Continued

FY 1999				FY 2000				FY 2001			
1	2	3	4	1	2	3	4	1	2	3	4
										X	

(U) -AIP Interface with DDLII

(U)

*- Denotes Completed Event

X-Denotes planned event

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)								DATE February 2000		
BUDGET ACTIVITY				PE NUMBER AND TITLE					PROJECT	
07 - Operational System Development				0305207F Manned Reconnaissance System					674820	
(U) <u>A. Project Cost Breakdown (\$ in Thousands)</u>										
				FY 1999		FY 2000		FY 2001		
(U) Primary Hardware Development				30,683		6,127		0		
(U) Software Development				13,140		5,093		0		
(U) Government Engineering Support				2,081		400		0		
(U) System Testing				1,625		815		0		
(U) Total				47,529		12,435		0		
(U) <u>B. Budget Acquisition History and Planning Information (\$ in Thousands)</u>										
(U) <u>Performing Organizations:</u>										
<u>Contractor or</u>		<u>Contract</u>								
<u>Government</u>		<u>Method/Type</u>		<u>Award or</u>		<u>Performing</u>		<u>Project</u>		
<u>Performing</u>		<u>or Funding</u>		<u>Obligation</u>		<u>Activity</u>		<u>Office</u>		<u>Total Prior</u>
<u>Activity</u>		<u>Vehicle</u>		<u>Date</u>		<u>EAC</u>		<u>EAC</u>		<u>to FY 1999</u>
<u>Product Development Organizations</u>										<u>Budget</u>
Raytheon (AIP & SENIOR GLASS)		CPIF		3Q96		N/A				<u>FY 1999</u>
L3Comm (AIP)		CPIF		3Q96						<u>Budget</u>
Cockpit										<u>FY 2000</u>
Fuel Conversion										<u>FY 2001</u>
QRC										<u>Budget to</u>
<u>Support and Management Organizations</u>										<u>Complete</u>
ASC/RAP/AFRL										<u>Total</u>
<u>Test and Evaluation Organizations</u>										<u>Program</u>
WR-ALC/LR - Site 2, Edwards AFB										

Project 674820

Page 11 of 12 Pages

Exhibit R-3 (PE 0305207F)

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE February 2000	
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT	
07 - Operational System Development		0305207F Manned Reconnaissance System			674820	
		<u>Total Prior</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget</u>	<u>Budget to</u>
		<u>to FY 1999</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Complete</u>
<u>Subtotals</u>						<u>Total</u>
Subtotal Product Development		0	46,684	11,826	0	TBD
Subtotal Support and Management		0	220	330		0
Subtotal Test and Evaluation		0	625	279		0
Total Project		0	47,529	12,435	0	TBD

Project 674820

Page 12 of 12 Pages

Exhibit R-3 (PE 0305207F)

UNCLASSIFIED